

3. In an explosive-engine, a cylinder, a compression-chamber for the explosive mixture, a pipe connecting the said cylinder and chamber, an inwardly-opening check-valve 5 for air connected with said pipe near the cylinder intake-opening, and a device for supplying fuel connected with said pipe immediately adjacent to the compression-chamber, the construction and arrangement being such 10 that when air is drawn through the valve and pipe into the said chamber it will be carbonized as it passes the fuel-supply but the air between the said fuel-supply and the cylinder will not be carbonized, and when communication is opened between the pipe and the 15 cylinder the said uncarbonized air will first enter the cylinder and expel the exploded gases before the explosive mixture is admitted.

4. In an explosive-engine, a cylinder, a 20 closed crank-chamber connected with the front end of the cylinder and chamber, a pipe leading from said cylinder to the chamber and communicating with both of the same, a valve opening into said pipe near the cylinder 25 intake-opening, through which valve the air is admitted into the pipe and crank-chamber, and a device for supplying fuel communicating with the pipe immediately adjacent to its entrance into the crank-chamber, the 30 arrangement and construction being such that when air is admitted to the crank-chamber it will be carbonized as it passes over the fuel-supply, and when the mixed gases are admitted to the cylinder they will be preceded 35 by a column of air confined in the pipe near the cylinder to expel the exploded gases therefrom.

5. In an explosive-engine, a cylinder, a compression-chamber for the explosive mixture, a conductor for the mixture connecting 40 the said cylinder and chamber, a valve near the inlet of said cylinder for admitting air to the conductor, means at the opposite end of said conductor immediately adjacent to the compression-chamber for admitting a fuel- 45 supply thereto, said means being entirely independent of the air-valve, the arrangement of the cylinder, the compression-chamber, the conductor the valve and said means being such that a blast of air will be admitted to 50 the cylinder in advance of the explosive mixture for the purpose of expelling the exploded gases therefrom.

6. In an explosive-engine, a cylinder, a crank-chamber within which the explosive 55 mixture is compressed, a crank within said chamber, a piston within the cylinder, the forward end of which is adapted to enter the crank-chamber, said end of the piston being concaved in shape so as to accommodate the 60 movement of the crank, a conductor connecting the crank-chamber with the cylinder, a valve for admitting air to said conductor near its inlet to the cylinder, and means independent of the said valve for supplying fuel to the 65 conductor immediately adjacent to the crank-chamber, for the purpose specified.

In testimony whereof I affix my signature in the presence of two witnesses.

JOSEPH A. WILLIAMS.

Witnesses:

C. McELROY,

J. B. HULL.